

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (currently amended) Method for treating copper sulphide containing ore, comprising ~~a step of biological leaching whereby the minerals are subjected~~ subjecting the ore, in reactors (1) in cascade arrangement, wherein the temperature is maintained between 75°C and 85°C, to the action of a bacterial culture, which comprises a thermophilic Sulfolobus bacterium ~~of the Sulfolobus type~~, leading to solution of ~~[[the]]~~ copper, in which a solid mass proportion of the culture medium is maintained above 10%, characterized in that, ~~during said biological leaching step:~~

- a continuous supply of the ~~sulphur containing materials~~ ore is effected,

- the medium containing the bacterial culture is subjected to continuous mechanical rotary stirring to ensure oxygenation thereof and suspension of the solid elements,

- oxygenation is promoted by an injection into the medium of air enriched with pure oxygen.

2. (currently amended) Method according to Claim 1, characterized in that the ~~sulphur containing minerals are~~ ore supplied to the culture medium in the form of a sulphur

containing concentrate presenting a granulometry d80 less than one hundred micrometers.

3. (currently amended) Method according to Claim 1, characterized in that the bacterial culture used was previously subjected to an adaptation, by successive transplants on a substrate, ~~particularly of chalcopyrite,~~ by progressively and artificially increasing the concentrations of the copper in solution, in order to render it able to develop in media of which the mass concentrations of copper are of the order of 50 g/l.

4. (previously presented) Method according to Claim 1, characterized in that a pH included between 1.2 and 1.6 is maintained in the biological leaching reactors (1).

5. (currently amended) Method according to Claim 4, characterized in that the pH is maintained at ~~[[the]]~~ a desired value by addition of calcium carbonate.

6. (currently amended) Method according to Claim 1, characterized in that all ~~along~~ during the phase of biological leaching, the physiological state of the bacterial culture is monitored with the aid of means for on-line analysis of the gases emerging from the reactors.

7. (currently amended) Method according to Claim 1, ~~characterized in that the step of biological leaching which~~ is followed by a second step during which, ~~in a first phase:~~

- ~~[[the]]~~ pulp issuing from the biological leaching reactors (1) is admitted in precipitation reactors (5) in which

[[the]] iron is eliminated by provoking a precipitation of jarosite, by addition of calcite, and the solution is maintained at a pH less than 3,

- the neutralized pulp is admitted in a decanter (7) and a part of the solids is made to recirculate at the head of the precipitation reactors (5).

8. (currently amended) Method according to Claim 7, characterized in that, ~~in a second phase:~~

- [[the]] liquid issuing from the decanter (7) is admitted in neutralization reactors (11) in which a pH of the order of 3.5 is maintained, ~~particularly by an addition of calcite,~~ so as to entrain only a minimum of copper, and

- ~~- one proceeds with filtration of the pulp obtained~~
filtering obtained pulp.

9. (currently amended) Method according to Claim 8, characterized in that, ~~in a third phase,:~~

- [[the]] an aqueous phase of the liquid coming from filtration is admitted in a unit (17) of extraction by organic solvent in which it is subjected to the action of an extracting product, so as to transfer the copper of the aqueous phase into the organic phase,

- the operational conditions are modified so as to transfer the copper of the organic phase of the extracting product into a pure aqueous phase.

10. (currently amended) Method according to Claim 7, characterized in that ~~[[the]]~~ an outlet (19) of the extraction unit (17) is placed in communication with ~~[[the]]~~ an inlet (4) of the precipitation reactors (5), so as to cause part of the raffinate collected at this outlet (19) to be recirculated by causing it to traverse said reactors (5) again with a high flowrate (Q2) with respect to the flowrate (Q1) of the pulp coming from the biological leaching reactors (1), so as to provoke a dilution of the aqueous solution subjected to extraction, up to a concentration of copper ~~of the order of about 10 g/l, i.e.~~ up to a value corresponding to the possible extraction of the copper in an extraction unit (17).

11. (withdrawn) Device for continuously treating copper sulphide containing ores of the type comprising biological leaching means (1) in which the minerals are subjected to the action of a bacterial culture leading to the solution of the copper, at a high concentration, of the order of 40 g/l, followed by the means (5) for precipitating the iron contained in this solution, by addition of calcium carbonate, followed by means (17) of extraction by organic solvent, characterized in that the outlet (19) of the means (17) of extraction by solvent is in communication with the inlet (4) of the precipitation means (5), so as to cause a part of the raffinate collected at that outlet (19) to recirculate, by causing it to traverse the precipitation means (5) again with a high flowrate (Q2) with respect to the

flowrate (Q1) of the solution at the outlet of the biological leaching means (1), so as to provoke a dilution of the aqueous solution subjected to extraction, up to a concentration of copper less than that existing at the outlet of the biological leaching means (1) and preferably of the order of 10 g/l.

12. (withdrawn) Device according to Claim 11, characterized in that the reactors used during the biological leaching step comprise means for channeling the gaseous fluid which traverses them, towards condensation means.

13. (previously presented) Method according to Claim 2, characterized in that the bacterial culture used was previously subjected to an adaptation, by successive transplants on a substrate, particularly of chalcopyrite, by progressively and artificially increasing the concentrations of the copper in solution, in order to render it able to develop in media of which the mass concentrations of copper are of the order of 50 g/l.

14. (withdrawn) Device for treating copper sulphide containing ore, wherein biological leaching is conducted whereby the minerals are subjected, in reactors (1) in cascade arrangement, wherein the temperature is maintained between 75°C and 85°C, to the action of a bacterial culture, which comprises thermophilic bacterium of the Sulfolobus type, leading to solution of the copper, in which a solid mass proportion of the culture medium is maintained above 10%, the device comprising, during said biological leaching step:

- means for effecting a continuous supply of the sulphur containing minerals,

- means for subjecting the medium containing the bacterial culture to continuous mechanical rotary stirring to ensure oxygenation thereof and suspension of the solid elements,

- oxygenation means for injecting into the medium air enriched with pure oxygen.